To be presented to STAND, 10/6/01

## Groundwater Contamination at Pantex

- G.R.
- Thanks for inviting me
- Talk about groundwater investigations and contamination at the Pantex Plant
- Many of you dealing with Pantex for a long time and probably know much more about some of these things than I do – Please feel free to speak up if you think I've missed anything also, please ask any questions whenever you like

- Three parts

  First, what is known about the hydrology and contamination at Pantex

  Then, isn't known that needs to be known

  Finally, what work I think should be, and (in some cases may be being done by DOE) to fill data gaps so an effective contamination prevention/cleanup system can be put in place

## Known

- Information comes mostly from monitor wells installed by DOE

  Figure: Well locations

  Not all wells shown, e.g., N of plant between boundary and City of Amarillo well field

- 2 aquifers

  ~ 250 - 300 ft bgs – perched system >100 in Perched Aquifer,

  Unsaturated – no groundwater between perched aquifer and Ogallala

  ~ 350 - 450 ft bgs – Ogallala Aquifer ~30 in Ogallala (major sources of gw in region)

- Flow directions

  Perched – variable, depending on location

  Ogallala – SW to NE

- Both contaminated

  Explosives (e.g., RDX), Solvents (TCE), Fuel components (benzene, toluene), Metals (Cr)

  Perched aquifer – figure - RDX, ~ 2mi x 3 mi.
  Pump and treat cleanup system (Interim Corrective now working along eastern boundary of plant (since 1995)

  Ogallala – figure - known to be contaminated near Burning Grounds (TCE, toluene)– contaminants also found up to a mile from boundary, near public supply wells operated by City of Amarillo (benzene, toluene) .

**Not Known**

- Extent of perched aquifer – not present everywhere but still some areas where DOE hasn't looked

- Extent of contamination in both aquifers. Large areas not investigated - no good reason to presume not contaminated

  Perched –

  Ogallala – figure – areas without wells

  Pantex Lake – effects of past discharges (1942 – 1970) on water quality.

- Flow rates of groundwater and contaminants in Ogallala

- Background

  Native vs. background
  Native = quality unaffected by human activities
  Background = quality that would exist if Pantex had no effect. So, contaminated water flows onto Pantex is considered background for Pantex

Important to properly identify background concentrations because that's the main criterion DOE going to use in deciding which areas need to be cleaned up. Don't intend to cleanup concentrations of contaminants less than background. Reasonable.

However, DOE attempted to identify background concentrations in past and had some problems. Part of problem used samples from many miles away from Pantex to establish background – in some cases more than 20 miles away.

figure

This resulted in some estimates of background concentrations (for example $NO_3^-$) that were significantly higher than concentrations that actually existed in the vicinity of the plant. If accepted, this could result in a decision not to cleanup contaminated areas – because contaminants would be declared to be background.

Redoing estimates of background – but – last I heard thinking of using samples from wells down gradient (in potential flowpaths of contaminants), and wells on Pantex. Not good ideas.

One of the Pantex wells considering using had the highest concentrations of thallium found in the area

Another potential problem is with thallium. DOE had said these high concentrations may represent background – even though found on plant property. This is highly questionable, and this position, if DOE still holds it, should be closely examined before it is accepted.

## Work to be Done

- More monitor wells

  extent of perched

  distribution of contaminants in both aquifers

  define background in Ogallala – (?use of private wells? – problem, don't always know important details, e.g., what units tapped – but, if can get reliable samples, should be used where available)

  Basic hydrologic data (e.g., K, Kds) - to allow us to predict contaminant flow rates and design cleanup systems. Also needed to build reliable models.

- City of Amarillo wells sampled for contaminants found in Ogallala at Pantex

- Modeling predict:

  Where going
  How long to get there
  What concentrations when get there

  Model by itself is useless – Must have site specific measurements of variables that control contaminant transport – This is what has been lacking

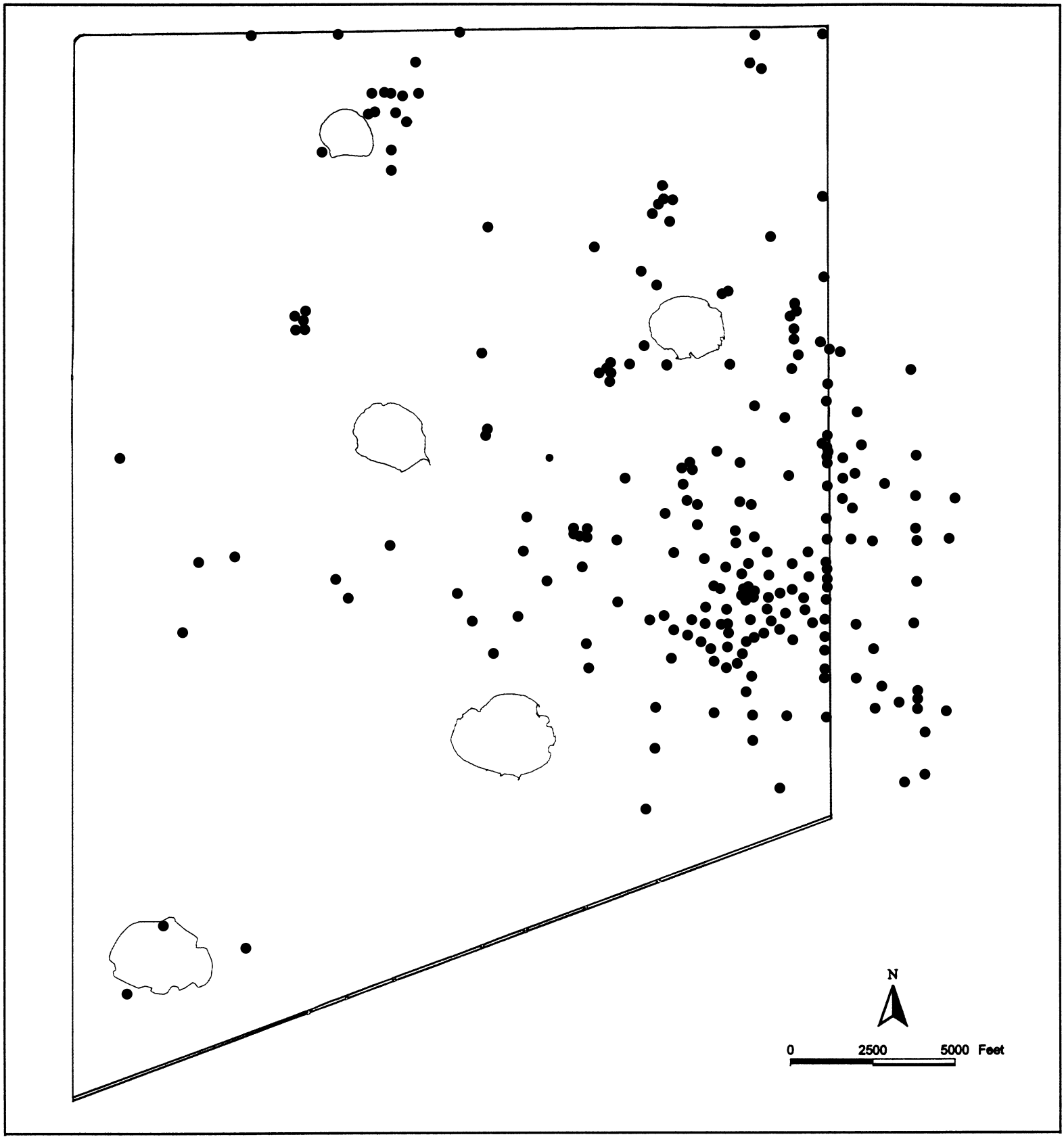
  Modelers in general are pretty smart people, and sometimes they won't allow a mere lack of necessary information stop them.

  DOE predicted take contaminants from Pantex between 135 and 1500 yrs to reach nearest City well. May seem ridiculous now – that's what can happen when modelers work without site specific data and without understanding site specific conditions.

  DOE realizes past modeling inadequate

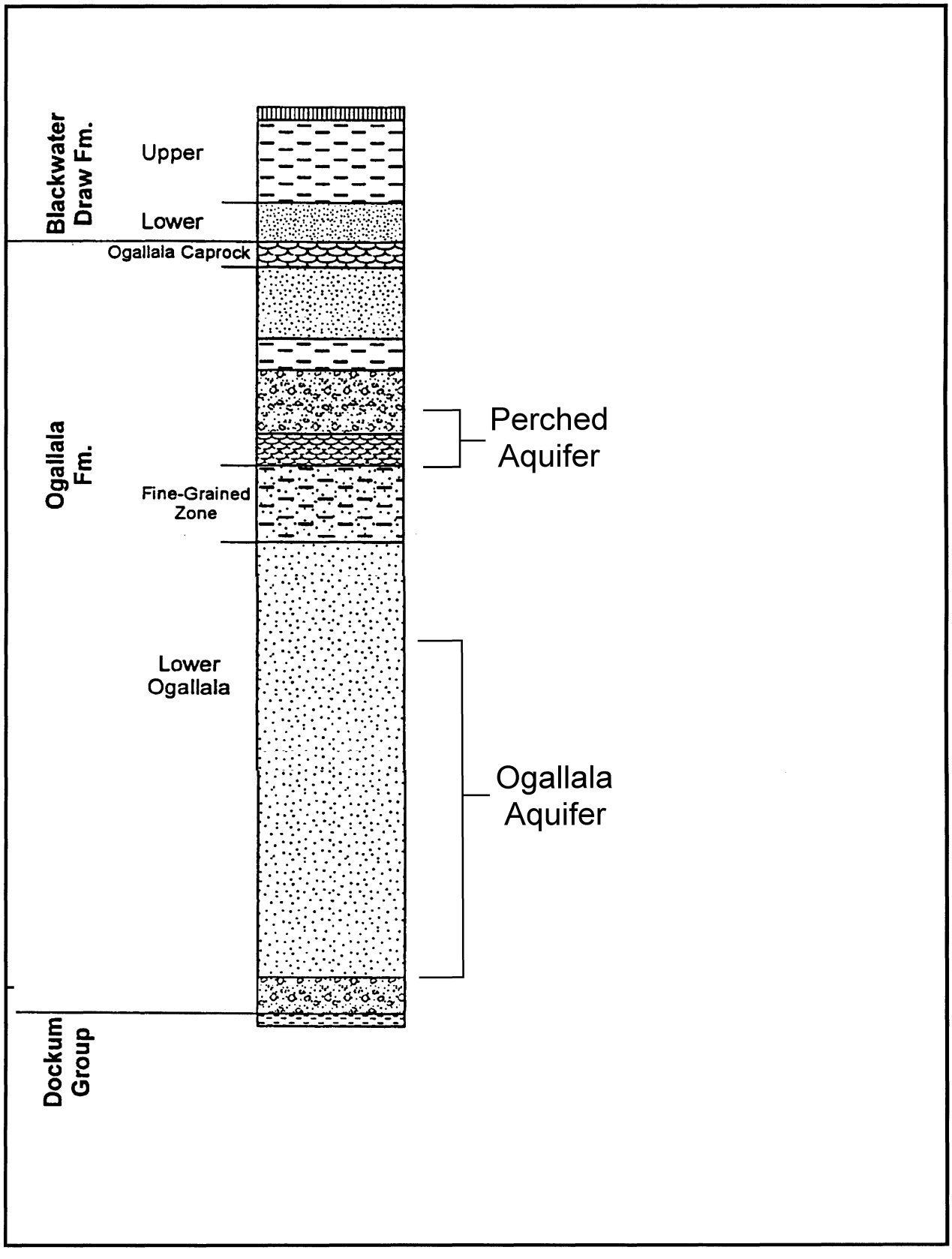
  TAG; Me, Ray Bradey, Pam A.

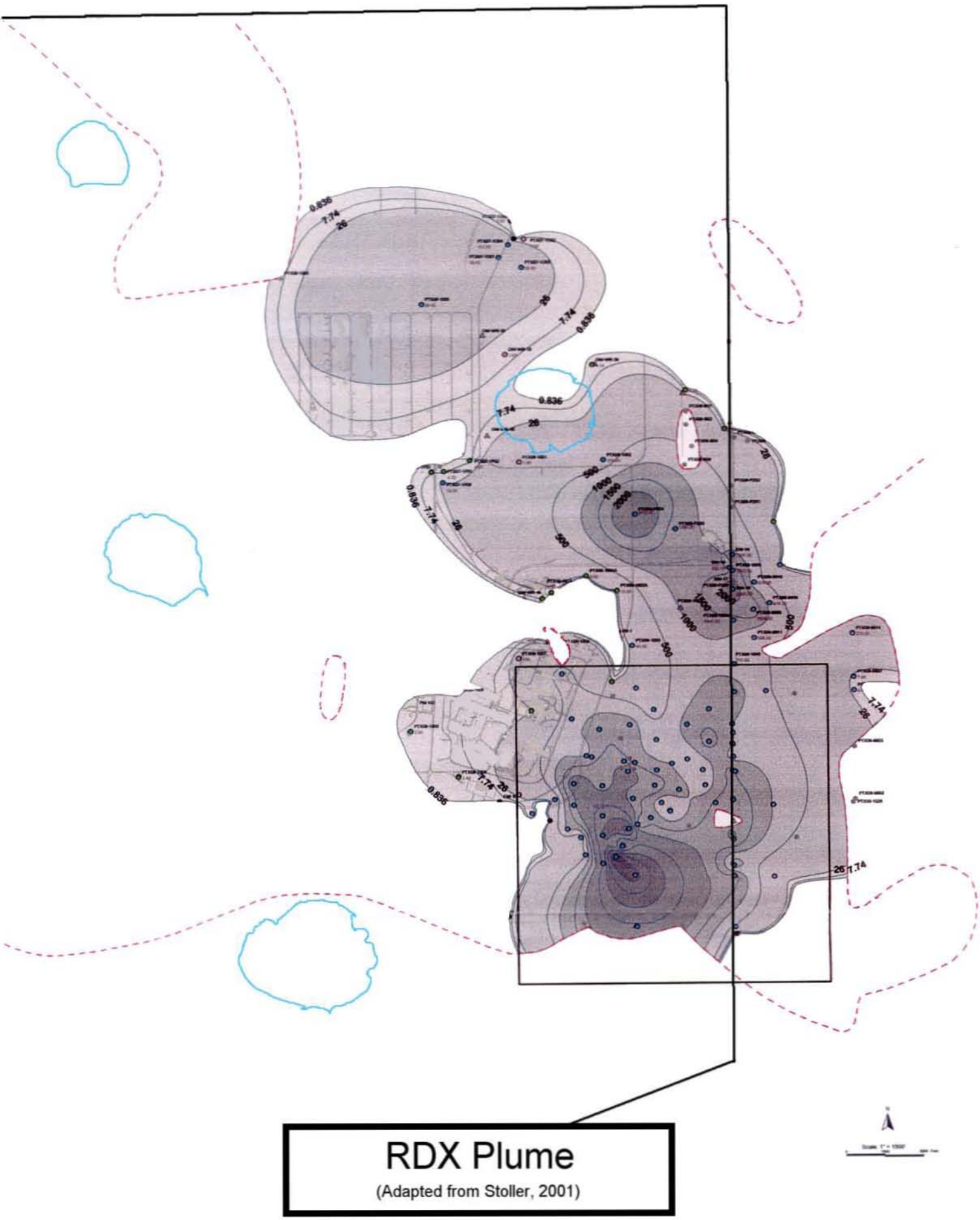
History of ignorance, foot dragging, and deception by omission




# Monitor Well Locations

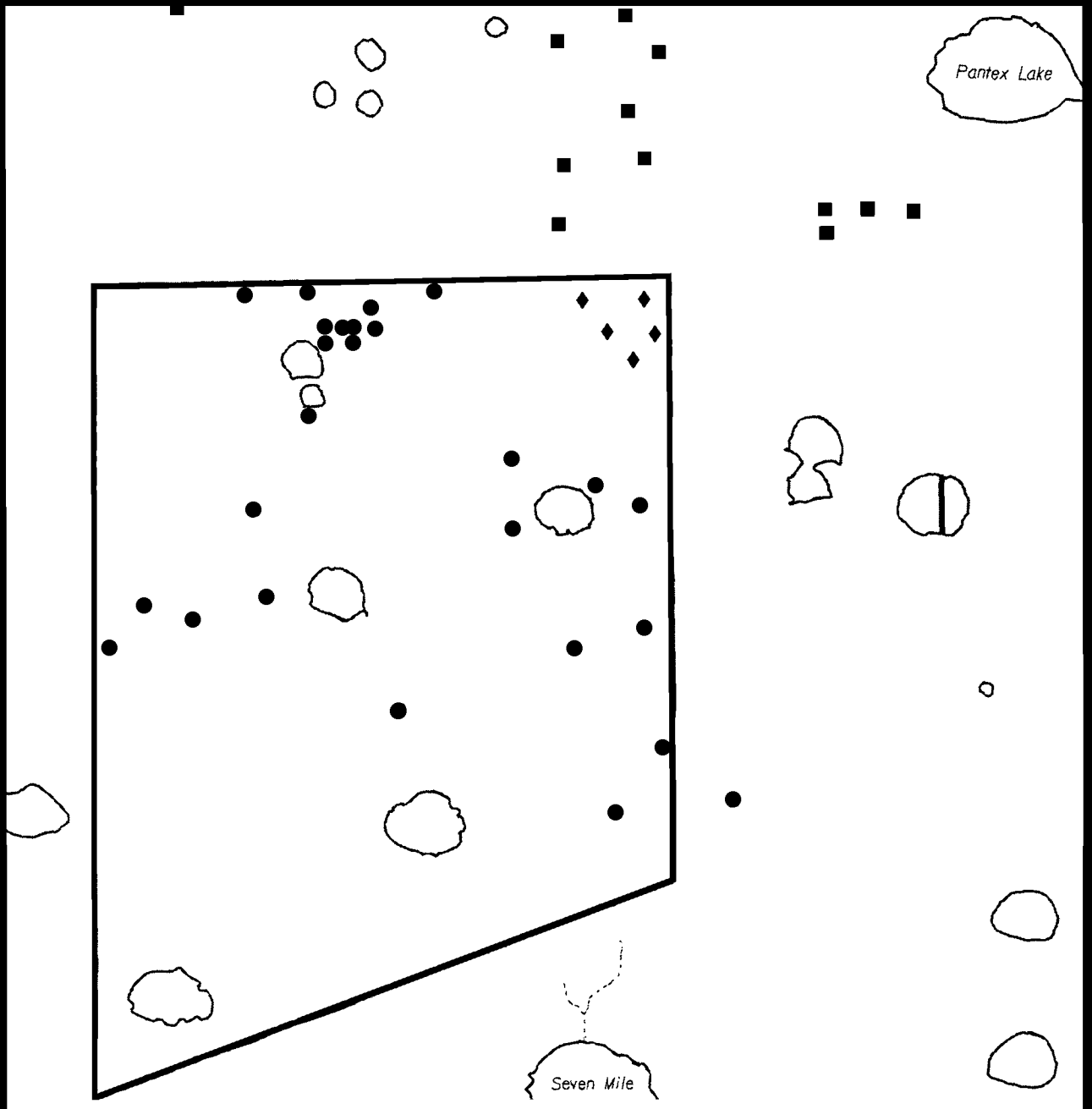
(Adapted from Stoller, 2001)


Blackwater Draw Fm.
Upper
Lower
Ogallala Caprock
Ogallala Fm.
Perched Aquifer
Fine-Grained Zone
Lower Ogallala
Ogallala Aquifer
Dockum Group




# RDX Plume

(Adapted from Stoller, 2001)




# Ogallala Wells

- ● DOE Monitor Wells
- ■ City of Amarillo Supply Wells
- ♦ DOE Supply Wells